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Results of the implementation process evaluation of CIVITAS II funded measures for sustainable urban transport

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Abstract

The EU funded CIVITAS Initiative concerns ambitious cities that are introducing sustainable urban transport policy strategies. Within CIVITAS II, 208 measures spread over 17 cities were co funded as part of this programme. The aim is to achieve a significant change in the modal split towards sustainable transport modes. The project CIVITAS-GUARD has been established as the Specific Support Action for CIVITAS II to efficiently and professionally plan, realize, manage and control the following activities: Independent overall cross-site evaluation of the measures taken by the CIVITAS II cities including monitoring and analysis of the implementation process. This paper will be dealing with the implementation process and its relation to measure success to discover factors of success and risks to fail. The data for this analysis were generated mainly through a standardised online questionnaire, measure responsible persons filled in during the ca. 4 years of the CIVITAS II project life time. Additionally data were added from external statistical databases. Six different aspects influencing the success of a measure implementation and meeting the objectives successfully were distinguished in the analysis. The external measure background (size of the city, economic background, existing traffic situation etc.), the measure type (supporting or restricting specific modes, complexity, sensibility, etc.), the internal measure framework (target size and population, resources available and from where, etc.), the organisations and stakeholders involved in the implementation strategy and finally barriers and drivers occurred during the implementation phase. Based on the structure of influencing variable types above several results of the bivariate correlation analysis could be identified and will be discussed in this paper.

Keywords: Implementation process, sustainable transport measures, CIVITAS-initiative, Evaluation

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1. Introduction

Responsible planners and managers for transport measure implementation welcome the idea to put some emphasis on the processes of measure implementation to learn more about their interrelations and dependencies. However, as life is too complicated it is not so easy to develop recipes for measure implementation such as for baking a cake but research work can supply a basic structure for implementation or provide a decision support system [May et al. 2009]. The CIVITAS II programme funded by the EU offered a chance to analyze a big number of measures during their implementation phase in the years 2005 to 2010 in a standardised way. The aim of these analyzes was to determine significant variables and to show its dependency with regard to the measure success defined as in chapter 2. There is some evidence in literature that successful measure implementation goes beyond factors such as sufficient budget and time [Attkinson 1999], which was investigated in this research project.

2. Methodology

For each CIVITAS II measure a measure contact person was defined, who delivered information with regard to the measure framework and the implementation process. The data for this analysis were generated mainly through a standardised online questionnaire, responsible persons filled in during the CIVITAS II project life time (years 2005 - 2010). Additionally data were added from external statistical databases. Based on the data collection for process evaluation carried out during the CIVITAS II life time and stored in the common database for process evaluation, specific variables were extracted for the analysis [Klementschitz 2009]. These are all quantifiable variables, either cardinal or ordinal or nominal. More than 500 different quantifiable variables can be distinguished in the database. All variables collected were categorised after their characteristics as shown in figure 1. Whereas variables describing Background of measure, measure type, framework of implementation and implementation strategy are independent variables, variables describing measure success are defined as dependent variables from those above.

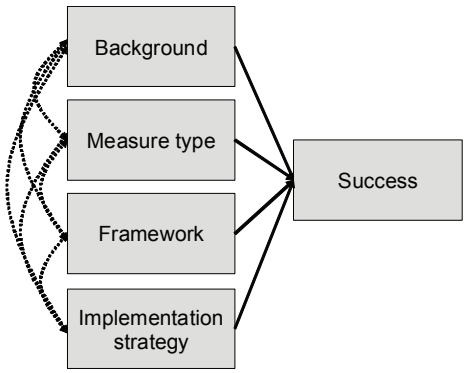

Fig. 1. Success in dependence on different aspects for the analyses for process evaluation [Sammer 2007]

Starting with more than 500 variables, all these variables were screened by hand to determine if a relation or causality between two or more of them or the distribution of the variable itself is of interest. Hypotheses were formulated to be tested. This procedure decreases the amount of data produced in the analysis significantly. As a next step a cluster analysis was carried out to support the clustering of certain

variables. This work was done in parallel with clustering by hand. The aim of the clustering is to pool measures or single attributes with similar characteristics and to separate those with different characteristics, to be able to test the formulated hypothesis, e.g., testing a positive or negative influence of stakeholders on the (success of the) implementation process. For this, the various stakeholder types can be clustered in stakeholders, e.g., with professional interest in the measure, stakeholders individually affected by the measure, etc. in order to decrease the complexity. The clustering will be refused if it does not show differences between these clusters. Therefore the challenge is to formulate the best hypothesis to discover such differences. The bivariate correlation coefficient r as the result of the correlation analysis carried out, can receive a value between -1 and +1. If the value of r equals 0, there is no relation between the two variables analyzed; if the value r = - 1, the two variables analyzed are in the most extreme opposite direction (if variable A is of highest value, variable B is always on lowest value). Contrary to this if the value of r = +1, the analyzed variables are in the same direction (if variable A is of highest value, variable B is always on highest value as well).

3. Definition of success

The dependent variable "Success" can be defined and evaluated in various forms [de Wit 1988]. In this work two dimensions of success were collected: (a) success in relation to the output respective to the objectives set before the implementation and (b) success of the implementation process itself. Beside this, success can be related to the measure (implementation) as a whole or to single steps or strategies (e.g., stakeholder involvement activities, strategies applied to overcome specific barriers).

For the Evaluation of success in relation to objectives, the following categories were used: 1 = measure cancelled (no result achieved at all); 2 = measure still pending (not yet clear whether and what result will be achieved); 3 = measure completed, but with substantial downgrading or downsizing; 4 = measure completed with substantial revisions, but main goals achieved; 5 = measure completed as planned without substantial revisions. This means the scale of this scoreboard is non linear. There are pros and cons for this definition, e.g., what if the objectives were defined on a very low level? What if the objectives were met, but the output is still poor? On the other side, if one judges the absolute output of the measure, it had to be related to the area applied, the target group accessed or the money invested again to create comparative data. It was decided to use this approach, as the definition can be understood easily by all persons concerned in the data collection for this variable.

For the Evaluation in relation to success of implementation the following categories were used: 1 = Not Successful, 2 = Moderately Successful, 3 = Successful, 4 = Very Successful. This is a linear scale. The data collection for measure success was done first of all by the measure contact persons themselves. In order to cross check the information the same data were collected from the project evaluation managers (which were asked to evaluate the success of the implementation) and by the responsible GUARD-partner monitoring the output evaluation TRG, University Southampton, UK (who evaluated the success in relation to the objectives). Of course this procedure is only a rough estimation and there were some expectations that respondents would overestimate their performance. But as results later show, there are differences in the evaluation of the measures created by this procedure, so not all of the success variables were rated as "very successful". More important than the absolute value of success (e.g., average per cluster, both output and process success) are the differences between e.g., measure clusters to receive information of uneven developments. The procedure proved the feasibility of the approach under given resource restraints for this task. A broad survey of persons concerned or actual users and non-users of the measure respectively visits to the city by independent judges were out of discussion because of lacking resources. Additionally, such a procedure does not necessarily deliver better results [Farh et al. 1988].

4. External measure background

The external measure background means the context of the measure in relation to the city where the measure was implemented. For that reason various variables were collected in parallel to the data collection for measure implementation, such as the car ownership rate, the modal split, the economic situation and different geographical characteristics of the city. The hypothesis formulated was: The success of the measure is not only dependent on the implementation process itself but on external factors as well [Wang et al. 2008]. In current discussions about measure implementation it still remains unclear if e.g., a measure supporting cycling activities is more easily implemented in a city with a very low mode share of cycling (lack of "tradition") or in a city with a very high mode share (saturation effect) [Pucher 2010]. The main outcome of the correlation analysis of the external measure background is the weak relation to success of the measure implementation of CIVITAS II in general (figure 2).

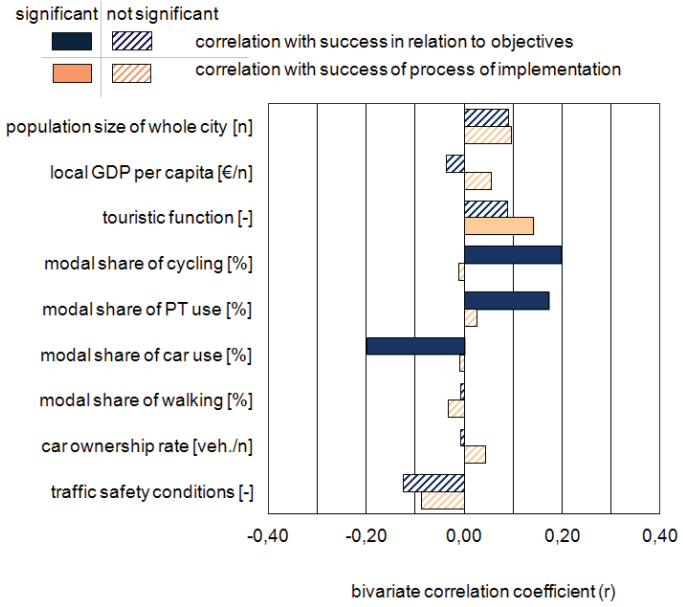

Fig.2. Relevant variables of external measure background and their relation to success in order to meet the objectives and success of implementation process (r=-1 full indirect correlation r=0 no correlation r=1 full direct correlation), n=208 measures

This is good news, as some of these attributes are not subject of the change but of given characteristics of the city. There is a little, but not significant, correlation of population size and success. Bigger cities are more successful than smaller cities in this sense. All other general data collected do not show any strong correlation to success. From the economic data set collected, only the touristic function of the city correlates with success, showing significant values with the success of the measure implementation process. The more touristic the city is the more successful the implementation process is. The modal shares – if at all – only influence the output success (meeting the objectives). A high share of public transport usage or cycling is working as a driver, whereas a high share of private car traffic is working as a barrier. Other modes are neutral to the measure success. It can be concluded that cities with car-friendly

infrastructure resulting in a high share of private car traffic need to put more effort into the measure implementation to reach the set objectives in comparison to those cities with a high modal share of public transport. It seems the implementation of innovative transport measures is easier if the city has already taken some action supporting public transport or cycling.

5. Measure type

The measure types within this context are related to the CIVITAS II program and do not represent all possible measures in the field of transport policy. As one example to rise here, soft measures as alone-standing measures (such as awareness campaigns, individual marketing) are missing and literature shows promising successes of such measures, e.g., [Möser et al. 2011]. This leads to the conclusion, there might be some more successful or efficient solutions outside of the framework of the CIVITAS II program, which cannot be verified here. However the measure types in CIVITAS II do cover a majority of possible urban transport measures and were thematically clustered in 8 groups for the evaluation activities within CIVITAS II. Figure 3 shows the average values of success per measure cluster. The figure shows no clear picture with regard to success comparing measure clusters (C02, C06, C07, and C08), aiming to decrease the negative impact of motorized modes through restriction or innovation and measure clusters (C01, C03 and C5), which are supporting usage of non motorized modes. The result of this analysis can be interpreted in two different dimensions. (1) If there is a given budget and no specific thematic restriction cycling & walking (C03), traffic management & control (C06) or public transport measures (C07) should be preferred in order to achieve a successful measure implementation. (2) If the thematic subjects of clean vehicles & fuels (C02) and especially logistics & goods distribution (C04) are in the focus, special attention should be paid in the implementation process as these measures imply an over-average risk of failure. In case of the most critical measure cluster logistics & goods distribution (C04) the problematic combination of following characteristics was revealed: The specific group of stakeholders included, the type and size of the target population as well as the financing structure and the strong acceptance barrier included. The most successful measure cluster cycling & walking shows a good combination of modes concerned, objectives addressed, stakeholder groups concerned and intensity of drivers. Additionally cycling and walking measures were implemented more often in cities with a higher modal share of non-motorized traffic.

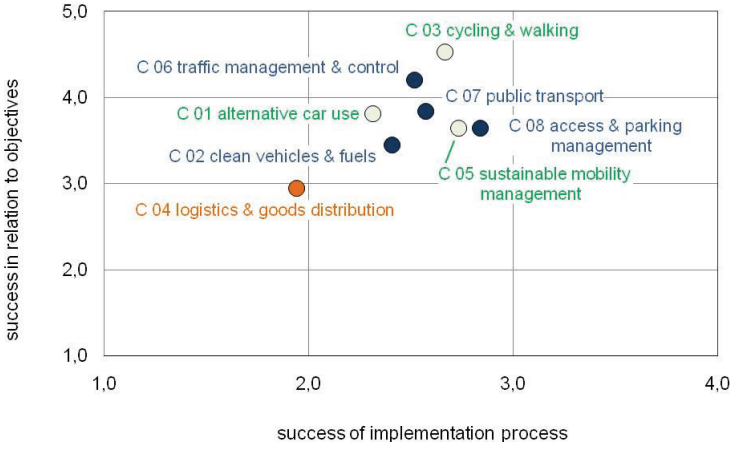

Fig.3. Measure clusters and their relation to success in order to meet the objectives (5 = fully met) and success of implementation process (4 = very successful), n=208 measures

6. Internal measure framework

In comparison to the measure types (as they are grouped in the measure clusters), the internal measure framework - as it is defined here - includes issues with some more possibilities to influence when initiating a measure implementation. This includes the size of the measure: Is it better to start with a small pilot study or to implement measures on a broad scale in the whole region immediately? How should costs be dealt with concerning the measure implementation and its operation after the official launch or opening? Is there a relation to frequent changes of responsibilities within the project team? In figure 4 the relation of aspects of the internal measure framework and their relation to success are shown. There is a very strong relation between the cost structure and the success. The smaller the share of operation costs were, the more successful achieving the objectives was and – even stronger – the more successfully the measure implementation process was carried out. Contrary to this, the total costs or the total effort in person-months do not indicate a relation with success. Similar to the total person-months, the planning size does not show any clear indication either, if a big or small planning size of target area results in a more successful measure implementation or not. A clear relation could be found between the measure success and the availability of information (e.g., surveys) at the start phase of the measure implementation process.

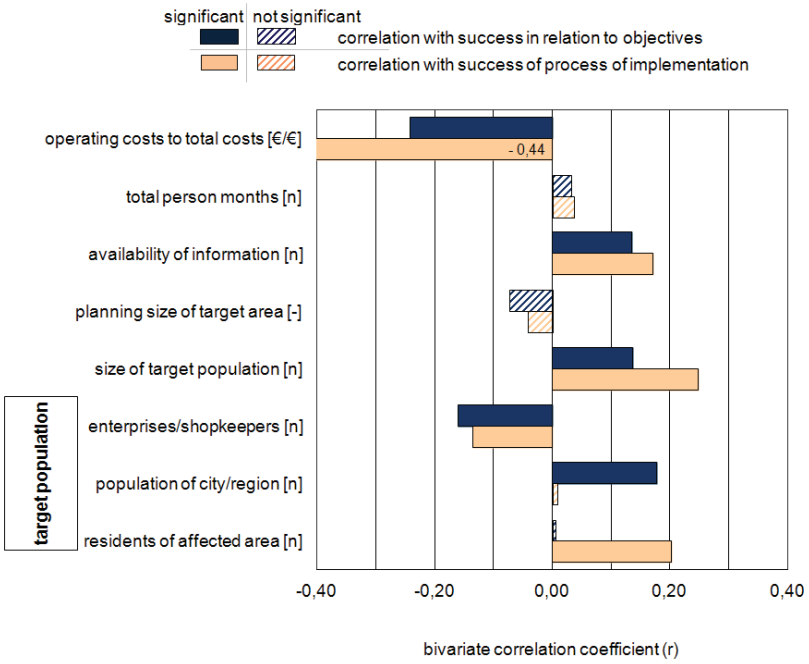

Fig.4. Relevant variables of internal measure framework and their relation to success in order to meet the objectives and success of implementation process (r=-1 full indirect correlation r=0 no correlation r=1 full direct correlation), n=208 measures

In addition, the size of the target population shows a clear relation with both the measure output and the process implementation; the bigger the target population is, the more successful the measure turns out. It can be assumed that if the size of the target population is very small (e.g., hospital employees, university employees, a small group of shop owners), the success of the measure very much relies on the

co-operation of these groups, which empowers these groups to raise their preconditions for cooperation. Analysing the defined groups of target population across the measures, three groups show a significant relation with success. Enterprises and shopkeepers show a strong negative correlation, both with the implementation and the objective success. The population of the city in general (as target population of the measure) relates with an over-average output success, whereas residents of the affected area relate with an over average successful process implementation. Other groups are neutral (not shown on figure).

7. Implementation strategy

The implementation strategy and its single activities of course are the heart of each measure implementation process, but a structured recording of it is difficult, as many measures have their own individual peculiarities which demand individual solutions. Such information is better documented in a qualitative way [Marsden 2009], which was done in the cluster reports and the policy advice notes within CIVITAS II.

	all involvement tools	meeting	mailing info. materials	interviews/survey	static info. materials	press release	take away materials	working group: regularly	exhibition/info. centre	public meeting/hearing	public event	workshop: occasionally	internet based info.	individual contacts	general strategy	project presentation	radio/TV show	press conference	focus group	marketing/promotion	instructions/training	mediation process	info. via trade press	scientific conference	helpdesk/tel. hotline	press office
all stakeholders		91	75	71	66	59	58	56	40	40	40	38	37	35	34	33	29	26	17	12	11	7	6	4	3	1
general public	112	+	+	++	+++	+++	+++		++	++	++	+	+++	+	+	++	+++	+	+	+						
loc /reg administration	107	+++	+	++	+	++	+	+++	+	+	++	++	+		++	++	+	+	+			+		+	+	
transport operator	67	+++	++	+	+	+	+	++	+	+	+	++	+	+	+	+				+	+	+	+			
residents of the area	49	+	++	++	++	+	++		+	++			+	+	+		+	+								
loc /reg politicians	47	+	+		+	+	+	+	+	+	++		+	+	++	+	+	+		+		+				
public transport users	42	+	+	++	++	+	++		+	+	+	+		+	+		+	+	+	+						
loc /reg businesses	41	++	++	++	+	+	+	+	+	+		+	+	+	+	+		+	+				+			
media: radio/paper	37		+		+	++			+	+	+	+	+	+	+	+	+	++		+			+			+
car drivers	35		+	+	++	+	++		+	+		+	+	+	+		+	+		+						
commuters: work/edu	30	+	+	++	++	+	++		+			+	+	+	+						+					
employees at work	25	+	+	+	+		+	+		+	+	+	+	+	+	+										
cycling/walking group	25	+	+	+	+	+	+		+	+	+	+	+				+			+	+				+	
university/research inst	25	++		+		+	+	+	+	+	+	+		+							+			+		
business association	23	+	++	+	+			+	+	+			+	+	+				+			+				
private consultant	21		++			+		+	+			+	+	+							+		+			
goods transporter	21	+	+	+			+	++		+	+	+				+			+					+		
priv transport company	18			+	+	+	+		+		+			+	+		+	+		+						
potential PT users	18	+	+	+		+	+	+	+			+	+	++			+						+			
visitors: shops/tourism	16		+	+	++	+	+		+		+		+				+									
disabled association	12	+	+			+		+	+			+		+		+			+							
students	11		+		+	+		+		+		+						+								
NGO: social/envir group	11	+	+				+		+			+		+	+	+					+					
disabled/elderly people	10	+	+	+			+		+							+				+						
nat adminstration	10							+		+	+					+						+				
private company	8			+					+			+		+		+										
cyclists/pedestrians	8	+	+					+						+					+					+		
taxi association	8	+	+					+					+						+							
loc interest group	7							+			+			+					+							
public body: non transp	6	+		+				+			+					+										
national politicians	5		+														+						+			
women	5						+				+					+		+								
nat /internat businesses	5			+	+				+			+														
motorist association	4							+		+					+											
car sharing users	3			+										+	+											
passenger association	3					+		+		+																
public transp authority	3	+															+	+								
teachers/trainers	3		+													+									+	
car sharing association	2											+			+											
children	2															+			+							
hotels/board of tourism	2	+	+																							
others	1		+																							
school/education	1						+																			
unions	1																		+							

	+	infrequently used (<5)	not successful (<=2,50)
	++	frequently used (5 to <10)	moderately successful (>2,50 to <3,25)
	+++	very frequently used (>=10)	successful (>=3,25)

Fig.5. Matrix: Stakeholders versus involvement tools used in CIVITAS II and its success

Nevertheless, there are some common elements of the measure implementation which can be analyzed here. Which tools were used to involve which stakeholders and how successful were they? Which information types were used to decide the measure design and the implementation process? Which are the critical implementation steps with strong relations to measure success?

Stakeholder involvement is confirmed already as important building block for measure implementation [Bunn et al. 2009, Van Gestel et al. 2008]. Figure 5 gives more detailed information with regard to the stakeholder involvement activities in CIVITAS II. This table combines information about the stakeholders involved by different tools and the success of this activity across all measures. Producing take-away material was a very successful tool, often and successfully used to inform the general public or residents or public transport users, whereas this tool is not appropriate to get involvement of transport operators. Reading the table the other way round, problematic stakeholder groups such as local/regional businesses could be involved best through exhibitions and take-away materials. Disabled and elderly people were involved most successfully through interviews and surveys. The most successful tool to involve other stakeholder groups such as goods transporters and children is to hold focus group meetings, nevertheless with a different design of the event. This table can support followers in measure implementation as a practice-tested starting point for future stakeholder involvement activities. Stakeholders personally affected, such as residents of the area or their representatives, were mainly involved through tools to inform about the measure implementation (sending out information, raising awareness). Contrary to this, stakeholder groups with economic interests (or representatives of those) were mainly involved through interactive communication, in order to overcome barriers or to collect information. Overall, there is a bias with regard to the success of involvement as stakeholders personally affected could be involved more successfully in comparison to stakeholders with direct economic interest.

8. Barriers and drivers

Barriers and drivers are elements of the measure implementation process. Only for a minority of 6 measures out of 208 it was stated to have faced not any barrier during the measure implementation process. Therefore, it was decided to collect data related to barriers in a separate section of the questionnaire, deepening the degree of information about the risk, stakeholder groups related to the barriers or the strategies to avoid or overcome the barriers once occurred. Contrary to barriers, drivers related to the measure are reported clearly at a lower extent. The data of drivers were collected in open answer forms. Figure 6 shows the relation of barriers with respect to drivers to the success of measures. The good news is there are no strong relations to an unsuccessful measure implementation. The most problematic barriers are the acceptance and management barriers as well as - to a smaller degree - financial barriers which are impeding success in meeting the objectives. All other barrier types show no strong relation to the success, some of them relate with a good measure implementation process. Again the following effect can be seen here: if a barrier is expected, the preparation and implementation process is likely to be carried out more carefully. Designing strategies to avoid or overcome the critical situations results in an overall effect of a more successful measure implementation. This includes also leaving the original implementation path but without leaving the objectives set as described for example in the resistance model [Talvitie 2006]. As defined - and here more a plausibility check - the availability of a driver shows a significant effect on a successful measure implementation. As already mentioned, two groups of either stakeholders or target groups relate to a high degree with a problematic implementation process: Goods transporters and shopkeepers (local businesses). Contrary to the overall distribution of barriers, the acceptance barrier is the main barrier in relation to these two groups. This combination is a very critical issue resulting in weak success of measure implementation. Therefore strategies need to be found urgently, if those groups are involved, to deal with the acceptance barrier. Early involvement by the

installation of an information centre, workshops and meetings are the most promising tools to minimize the negative impact in such cases.

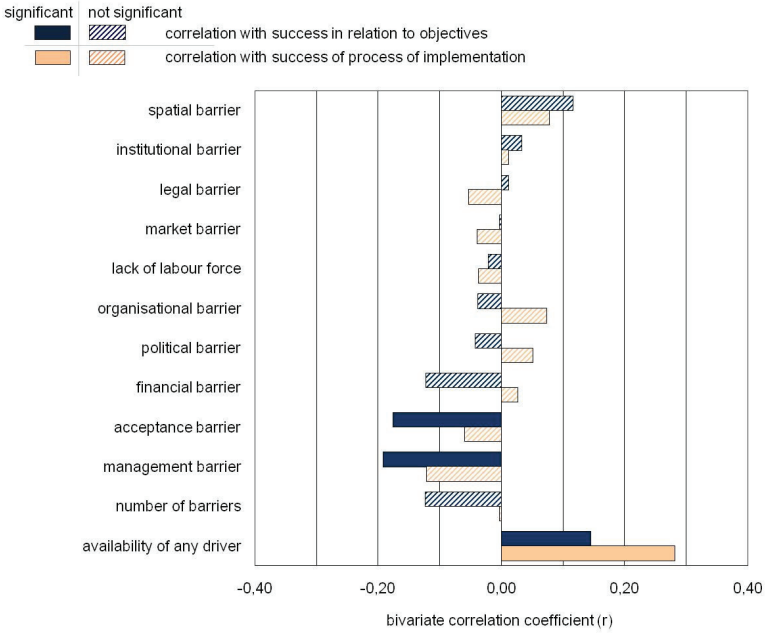

Fig.6. Relevant variables of barriers and drivers and their relation to success in order to meet the objectives and success of implementation process (r=-1 full indirect correlation r=0 no correlation r=1 full direct correlation), n=208 measures

9. Conclusions

The results of the process evaluation lead to a variety of conclusions from different points of view. Monitoring the implementation process is an important tool to learn more about modern implementation strategies in the field of transport measures. For a large number of measures implemented information could be collected in a standardised way to be able to make a correlation analysis to discover factors of success and risks of failure. Still, the monitoring of implementation processes is seen as a burden on one hand; on the other hand, however, many of the measure-responsible persons supported the idea of receiving advice and practice examples of successful implementation processes before starting their actual work. This paper, the more detailed cluster reports and the CIVITAS policy advice notes made use of such monitoring activities, helping followers implementing innovative transport measures not to start at point zero, and therefore increasing the efficiency of decisions and implementation processes. Documents mentioned above can be downloaded via the CIVITAS homepage (http://www.civitas-initiative.org/main.phtml?lan=en). With regard to the findings, many elements of a successful measure implementation process were not surprising, but were confirmed once again instead. This includes first of all an early stakeholder involvement. Some of the factors of success are given and are not easy to change, as it might be a characteristic of the city in which the measure is embedded, or the type of the measure such as which modes are concerned, the target groups or the stakeholder types involved. This does not mean one should avoid such measures at all, but very careful preparation work needs to be done before

launching the implementation process. This, first of all, relates to those measures where stakeholders were involved because of direct economic interests or their professional activities. The definition of the start date of the measure implementation should be harmonized with the external frameworks in which the measure is embedded, such as funding programs like CIVITAS II or even political elections, as not considering such time schedules can lead to weak measure success. Summarised in bullet points, the following conclusions can be drawn based on the lessons learned within the CIVITAS II process implementation, as recommendations for successful measure implementation:

- Expect more intense barriers during your measure implementations before you have achieved a critical mass of modal share of sustainable transport modes in your city.
- Expect more intense barriers if you are focusing on improvements in logistics and goods distribution in your city, as only a small target population is concerned and there is a lot of economic interest and competition between these actors in your city.
- Cycling and walking measures are very successful as technology and knowhow is available already today, and stakeholders generally support your implementation.
- If you can argue your measure improves the traffic safety situation in your city, this will likely support your measure implementation.
- Complex and controversial measures do not necessarily impede the measure implementation process, if you are aware of them.
- If you can define the whole population of your city and especially the residents of the affected area as your target population, the implementation process will more likely be successful.
- Try to avoid changes of the measure leader during the implementation process.
- Be aware that people affected in their economic interest can act more likely as a barrier for the measure implementation in comparison to other stakeholder groups.
- Produce take-away material about your measure, explaining the aim of the measure and some images of how it will/could look. Consider participation in local radio and TV-shows and organise public events during the measure implementation phase in order to raise the success of the measure implementation.
- Try to start with stakeholder involvement as early as possible.
- If you are in a cyclic funding regime try to start as soon as possible with the first implementation steps. Consider also political cycles, which can affect your measure implementation. Try to harmonise the implementation process with such cycles.
- Try to make use of potential drivers by amplifying potential drivers such as engagement and commitment of organisations and persons, or by receiving support from external positive promotion.
- Be aware of barriers by analysing the situation during the initial phase of the project implementation. Most problematic barriers are acceptance barriers (Who? Why? What possible consequence? How to change the situation?) and management barriers (What is the specific deficit? Are the responsibilities clear? Could the communication process be improved?), see also [Banister 2007].

As an outlook for future research work, this first attempt at standardised monitoring of process evaluation dealing with such a big number of measures being implemented could act as a starting point for the further improvement of such monitoring schemes (e.g., in CIVITAS PLUS). This could increase the number of case studies on the one hand and further develops the methodology for an EU-wide standardised process monitoring in the future on the other hand. If more monitoring and implementation activities are combined more closely, based on the results of the work done before, in the near future these activities could have a direct immediate positive impact on the monitored measure implementation itself. Time and cost frames could be kept more efficiently and barriers could be diminished at an early stage in such cases. Subsequent increase of financial resources allotted to monitoring activities can lead to an overall cost saving for the total measure implementation.

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